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# ERADICATION OF THE CULTIVATED BLACK CURRANT IN WHITE PINE REGIONS



# ERADICATION OF THE CULTIVATED BLACK CURRANT IN WHITE PINE REGIONS

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Many years ago the European black currant (*Ribes nigrum* L.), or cultivated black currant, as it is commonly called, was introduced from Europe. Since then this plant has been cultivated to some extent in most of our white pine forest regions. Some people value the fruit for home use, and some grow it on a small scale as a commercial crop. The demand for the fruit is limited, however, and this currant is of very little importance as a food plant in this country as contrasted with its role as a spreader of the destructive white-pine blister rust disease in white pine regions.

The cultivated black currant is such a serious menace to the production of white pine that several States <sup>1</sup> have declared this plant a public nuisance and undertaken its eradication. Within those regions where white pines are important forest and ornamental trees the interstate movement of the European black currant is prohibited by Federal quarantine.<sup>2</sup> Through the cooperation of State officials, nurserymen, and the general public, rapid progress has been made in eliminating this plant in white pine regions, where its eradication will be of great help in accomplishing and maintaining control of the blister rust.

## Blister Rust Spreads Alternately Between White Pines and Currant and Gooseberry Plants

White-pine blister rust is an important tree-killing disease that repeatedly reached North America on white pine planting stock from Europe before the entry of these trees was prohibited under the authority of the Plant Quarantine Act of 1912. From the introduced pines the rust spread to native forest trees and now occurs in the principal commercial white pine regions of the country. It is caused by the parasitic fungus *Cronartium ribicola* Fischer. This fungus cannot spread from pine to pine but must live alternately on two different kinds of plants in order to complete its life cycle (fig. 1). These plants are the white, or five-needled, pines and the different kinds of wild and cultivated currants and gooseberries. The fungus is perennial on white pines, living in the bark and wood of infected trees year after year until the affected parts die, whereas on currant and gooseberry plants it occurs annually on the leaves. Blister rust is communicated between white pines and currants and gooseberries by means of wind-borne spores.

<sup>1</sup> The cultivated black currant has been declared a public nuisance and its possession and growth forbidden by statute in California, Connecticut, Idaho, Michigan, New York, and Oregon, and by regulation or proclamation in Massachusetts, Rhode Island, Ohio, Montana, Washington, and Wisconsin. Other States carrying on blister rust control work handle this problem under their general pest-control laws.

<sup>2</sup> Federal quarantine regulations prohibit the interstate movement of cultivated black currant plants, including parts thereof and seeds, into all States *except* into or within the area comprised by the States of Alabama, Arkansas, Florida, Kansas, Louisiana, Mississippi, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas.

During the spring the spores from diseased white pines are scattered over extensive areas and are so long-lived that they may retain their power to germinate and infect currant and gooseberry leaves after being disseminated for many miles by the wind.

The fungus develops in the currant and gooseberry leaves for about 2 weeks and then produces another kind of spore in small yellow pustules on the under surface of the leaves. These spores spread the disease locally from leaf to leaf and from bush to bush during the summer, greatly increasing the amount of infection on these plants. The fungus then produces small, brownish, threadlike projections on the under side of the diseased leaves, and these projections bear the spores that infect white pines during the summer and fall. These spores are so delicate that they usually infect only those pines that may be growing within a short distance of the diseased currants and gooseberries. The eradication of these bushes in the vicinity of white pines removes this source of infection and prevents the spread of the disease to the trees.

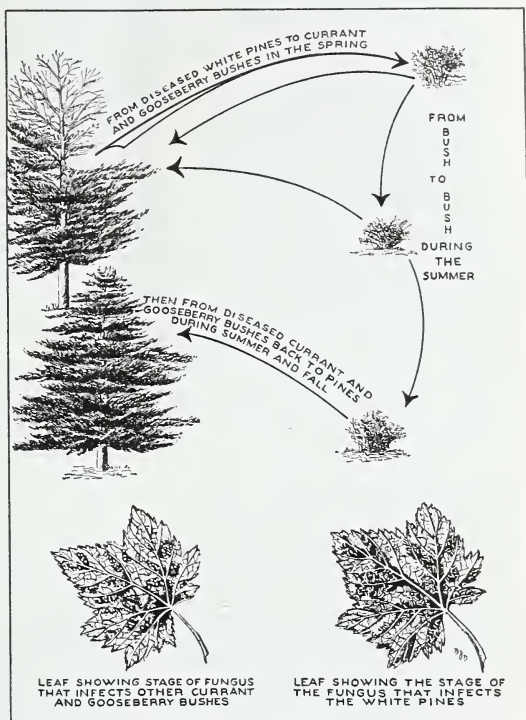


FIGURE 1.—Life cycle of white-pine blister rust. Small blisters full of yellow spores break through the diseased bark of white pines in the spring; these spores infect currant and gooseberry leaves. The fungus then produces on the underside of these leaves small yellowish pustules which contain the spores that infect other nearby currants and gooseberries. This stage is followed by the appearance of brownish threadlike projections which produce the spores that infect white pines.

### White Pines Are Destroyed by Blister Rust

The fungus enters the white pines through the needles and grows downward into the bark, where it produces cankers on the twigs and branches. Cankers located far out on the branches may die before reaching the stem, but those near the stem grow into it. The cankers girdle both the branches and trunk, cutting off the supply of food materials and killing the affected branches and later the entire tree.

Blister rust kills white pines of all sizes (fig. 2). The young trees are killed within a few years, and the next potential timber crop is thereby destroyed. The older trees that form the present crop are readily attacked by the disease, but usually the larger the trees, the longer it takes to kill them. In general, recently infected mature or nearly mature stands of timber may be harvested without serious loss



FIGURE 2.—A few European black currants at Pembroke, Mass., were responsible for the damage to these white pines: *A* and *B*, Trees killed by blister rust; *C*, fatal blister rust canker on trunk; *D*, branches killed and tree slowly dying as the result of blister rust infection.

if cut before the disease has time to kill the trees. The disease is very insidious, however, and white pines may become infected and the owner be unaware of the presence of the rust until the trees begin to die. There are many localities where a large proportion of the older pines have been killed because the nearby currant and gooseberry bushes were not destroyed, and the spread and intensification of the

disease has gone forward unchecked over a period of several years. Furthermore, within the infected regions the presence of currant and gooseberry bushes prevents natural restocking of forest areas with white pines. These trees cannot be maintained on areas where they grow in association with cultivated black currants or wild currants and gooseberries (fig. 3).

### White Pines Are of Great Economic Importance

There are eight native species of white pine in the United States, all of which are susceptible to blister rust infection. In the aggregate, they cover millions of acres of forest land in 36 States. These trees



FIGURE 3.—4. Wild currants and gooseberries growing in association with white pine; in such situations the continued production of white pine in infected regions depends on the eradication of these bushes. B, The European or cultivated black currant. C, Eradicating cultivated black currants.

bear their needles in clusters of five and because of this are known as five-needled pines. All of them are valued for scenic, recreational, soil-retention, and watershed purposes, and three are of great commercial importance. These are the northern white pine of the Eastern States, the range of which extends from Minnesota to Maine and southward to Georgia; the western white pine of northeastern Washington, northern Idaho, and northwestern Montana; and the sugar pine of southern Oregon and California. The value of their standing timber is estimated at between \$300,000,000 and \$400,000,000, in addition to a potential crop consisting of millions of acres of young growth that has a high future value.

These three species have exceptionally desirable qualities for forestry purposes. They reproduce readily, grow rapidly, and yield more in merchantable timber and in money value per acre than is usual with forest trees. As a result, they are extensively used for planting and reforestation and are regarded as major species in the practice of forestry. Their wood is of excellent quality, durable, and easy to work, and is consequently used in the manufacture of a large number of articles. The logging, lumbering, and milling industries utilizing white pines employ thousands of workers and contribute largely to the support of many local communities. These pines constitute a national-forest resource the maintenance of which is of great importance to the future development of forestry in the United States and to the stabilization of local communities and forest industries.

### Cultivated Black Currants Become Infected at Long Distances From Diseased Pines

The cultivated black currant is more susceptible to blister rust than are other kinds of currants or gooseberries and is readily infected at longer distances from diseased pines. There are several instances on

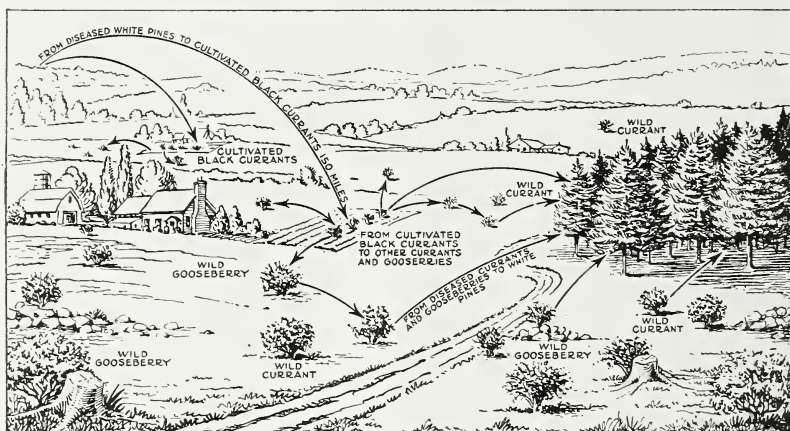


FIGURE 4.—Diagram showing the importance of the cultivated black currant in the spread of blister rust: Spores from diseased white pines infect cultivated black currants from many miles away. The spores produced on the cultivated black currants infect other currants and gooseberries in the vicinity, and then all the infected bushes spread the disease to nearby white pines, thus starting a new center of pine infection.

record where the rust has spread from pines to cultivated black currants for distances ranging from 25 to over 200 miles. Usually black currants become more heavily diseased than associated species and produce spores so abundantly that pines considerable distances away may become infected. The rust also spreads abundantly from the diseased black currants to other nearby currants and gooseberries, and then from the infected bushes to white pines. In this way new centers of pine infection are established (fig. 4). From these centers the disease increases locally on currant and gooseberry bushes and pines, and then later spreads long distances to other cultivated black currants. Field observations show that cultivated black currants usually have been responsible for starting new centers of infection and firmly

establishing the disease over extensive areas that otherwise would probably have remained free of the rust for many years.

The native wild black currant (*Ribes americanum* Mill.) found frequently in moist situations in fields and wooded areas and sometimes in cultivation should not be mistaken for the cultivated European black currant. It can be distinguished by the ridged stem of the current season's growth and the tiny yellow resin dots which occur on both the upper and lower leaf surfaces. The resin dots on the cultivated European black currant occur only on the under surface of the leaves, and the current season's stem growth is round and smooth. The native black currant, which occurs in the Eastern and Central States, is much less susceptible to blister rust and is of no importance in the long-distance spread of the disease.

### Eradication of Cultivated Black Currants Helps to Control Blister Rust

The control of blister rust is practicable in localities where white-pine values justify the cost of locating and removing the wild and cultivated currants and gooseberries within infecting range of the

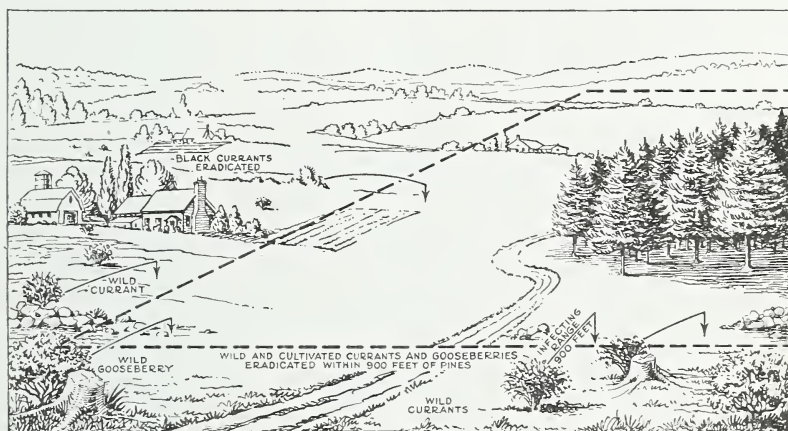


FIGURE 5.—This diagram shows how the control of blister rust is accomplished by the eradication of cultivated black currants in white-pine regions and the removal of other currants and gooseberries within infecting range of white pines. The wild currant and gooseberry bushes remaining outside the protective zone are too far away to damage the pines seriously.

trees. While the infecting range may vary under different forest conditions, a zone 900 feet in width free of currant and gooseberry bushes usually gives adequate protection to the pines. Where currants and gooseberries are growing under a dense brushy cover it is sometimes possible to reduce the width of this zone, but under open-field conditions it may have to be widened to give adequate protection. This is often the case where large plantings or groups of the more susceptible wild or cultivated species are encountered.

Cultivated black currants are being eradicated in white-pine regions because of their extreme susceptibility to infection and their importance in distributing the rust (fig. 5). With few exceptions, these plants are confined to gardens, from which, fortunately, they rarely

escape and hence have not become established in our forests. Gardens in the regulated areas are examined systematically; when cultivated black currants are found, the owners are interviewed, and permission is obtained to remove the bushes in accordance with State laws and regulations. The owners of such plants, in general, have displayed a fine spirit of cooperation in this work and placed the public welfare above their desire for the fruit.

### **Control Program Assures the Production of White Pines**

For several years the United States Department of Agriculture has been cooperating with the States concerned in carrying out a general program for the control of white-pine blister rust, an important feature of which has been the eradication of cultivated black currants in white pine regions. The program is aimed at establishing and maintaining control of the disease on valuable white pine forest areas so that they may continue to produce crops of these trees. This is accomplished by the eradication of currants and gooseberries within control areas and the periodic reworking of these areas to keep the growth of these plants suppressed and ultimately to bring about their complete elimination. The intervals between reworkings may range from 3 to 10 or more years, according to local forest conditions and the original abundance of the currant and gooseberry plants.

In addition the wide and rapid spread of the disease within and between white pine regions has been delayed by the eradication of cultivated black currants and the enforcement of Federal and State regulations governing the movement of white pines and currants and gooseberries. These measures have been effective in retarding the spread of the rust and in preventing its dissemination through the movement of diseased trees and currant and gooseberry bushes.

Excellent progress has been made in control work, and extensive areas have already been protected by the removal of both the cultivated black currant and the wild currants and gooseberries. However, in the remaining unprotected areas in which the future production of white pines is important, the disease is rapidly increasing, and in these areas prompt application of control measures is necessary, if serious losses are to be prevented.



